

What is claimed:

- 1                   1.     A digital x-ray imaging device comprising:  
2                   a top electrode layer;  
3                   a dielectric layer under the top electrode layer;  
4                   a sensor layer under the dielectric layer, comprising a photoconductive  
5 layer and a plurality of pixels, each pixel comprising a charge-collecting electrode;  
6                   a thin film transistor readout matrix connected to the charge-collecting  
7 electrodes; and  
8                   a variable power supply adapted to provide a range of voltages between  
9 the top electrode layer and the readout matrix.
- 1                   2.     The digital x-ray imaging device of claim 1 wherein the variable  
2 power supply comprises a programmable power supply.
- 1                   3.     The digital x-ray imaging device of claim 1 wherein the  
2 photoconductive layer comprises an element selected from the group consisting of:  
3 selenium, lead iodide, thallium bromide, indium iodide, and cadmium telluride.
- 1                   4.     The digital x-ray imaging device of claim 3 wherein the  
2 photoconductive layer is about 100 to about 1000 microns thick.
- 1                   5.     The digital x-ray imaging device of claim 4 wherein the  
2 photoconductive layer comprises a layer of selenium about 500 microns thick.

1                   6.       The digital x-ray imaging device of claim 1 wherein the power  
2 supply is adapted to provide a range of voltages with at least approximately a 2:1  
3 turndown ratio.

1                   7.       The digital x-ray imaging device of claim 5 wherein the power  
2 supply is adapted to provide a range of voltages between about 1.5 kV and about 3.0  
3 kV.

1                   8.       In a digital x-ray imaging device having a top electrode layer and  
2 a readout matrix, the improvement comprising a variable power supply adapted to  
3 provide a range of voltages between the top electrode layer and the readout matrix.

1                   9.       A method for providing a broad dynamic range for a digital x-ray  
2 imaging device comprising a top electrode layer; a dielectric layer; a sensor layer  
3 comprising a photoconductive layer and a plurality of pixels, each pixel comprising a  
4 charge-collecting electrode; a thin film transistor readout matrix connected to the  
5 charge-collecting electrodes; and a power supply for supplying a voltage between the  
6 top electrode layer and the readout matrix; the method comprising varying the voltage  
7 between the top electrode layer and the readout matrix to provide an acceptable signal-  
8 to-noise ratio over a greater range of exposures than provided at a single voltage.

1                   10.      The method of claim 9 further comprising using the method for  
2 non-destructive testing of one or more objects.

1                   11.      The method of claim 10 further comprising performing the non-  
2 destructive testing on an object selected from the group consisting of: a printed circuit  
3 board, a wax casting, a metal casting, a turbine blade, and a rocket cone.

1                   12.      The method of claim 9 comprising varying the voltage in a range  
2 between about 1.5 kV and about 3.0 kV.

1                    14.     The method of claim 9 comprising providing a signal-to-noise  
2     ratio of at least about 50.